

# Gallatin Dryland Cover Crop as Fallow Replacement

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2019

**County:** Gallatin  
**Average annual precip:** 14-15"  
**MLRA:** 44, Northern Rocky Mountain Valleys  
**Dominant Soil Type:** 451C Quagle-Brodyk silt loam, 4-8% slope  
**Acres:** 161  
**Planting Date:** June 15, 2019  
**Seeding Rate:** 530,000 seeds/acre= 10 lb/acre = 12.2 seeds/ft<sup>2</sup>  
**Seed cost:** \$12.41/acre (seed, no delivery)  
**Seeding Method:** John Deere 1820 Air Seeder  
**Row Spacing:** 7"  
**Tillage:** Minimum Till  
**Previous Crop and Year:** 2018, Spring Wheat, 52 bu/acre yield  
**Herbicides:** Pre: Unknown  
**Post:** Unknown  
**Insecticides/Fungicides:** Unknown  
**Fertilizer:** None  
**Irrigation:** Dryland  
**Termination Date:** First hard frost  
**Termination Method:** Freeze with winter kill  
**Next Crop:** Spring grain



Fig. 1. Cover crop on Sept. 27, 2019.

Table 1. Monthly precipitation at Bozeman Gallatin Field Airport, MT. Western Regional Climate Center, station #240622.

Bozeman	J	F	M	A	M	J	J	A	S	O	N	D	Total
30 yr avg 1981-2010	0.49	0.50	0.94	1.54	2.41	2.45	1.20	1.04	1.11	1.08	0.74	0.53	14.04
2018	0.99	0.48	1.24	3.19	1.93	3.86	0.23	0.95	0.48	1.09	1.00	0.16	15.60
2019	0.51	1.02	0.27	2.70	1.79	2.03	1.70	0.32	3.08	0.83	0.71	0.09	15.00

## Introduction:

A dryland cover crop was planted mid-June as fallow replacement in a small grain-lentil-summer fallow rotation. The cover crop was frost killed and then lightly grazed in the winter.

## Results:

The site was visited on June 27, and seeding depth confirmed at 0.4 - 0.5 inch. The radish had germinated and was emerging. Other species had germinated but had not emerged. No weed pressure was observed.

On August 6 the cover crop was growing well and all species present. The crop appeared slightly yellow. Field was visited again on September 27 and a clipping of aboveground biomass and a sample of the belowground radishes were taken. After air-drying, there was 1593 lb/ac, or 0.79 ton/ac, of aboveground biomass, and 563 lb/ac, or 0.28 ton/acre of belowground radish root mass. Assuming 910 lbs of forage per animal month, and 50% utilization rate on 161 acres, there were 141 AUMs available in this field.

There were 2293 Growing Degree Days (Base 40) from the time of seeding to the time of clipping (June 15 to Sept 27). Annual precipitation was 1 inch above normal of the 30-year average, with 2 inches above average falling in September. The primary species present in the final biomass were radish, which had gone to seed, and pearl millet. Starter fertilizer was not applied at the time of seeding. We would recommend fertilizer application for future cover crop plantings based on soil tests. Decreased overall cover crop biomass was observed when compared to cover



crop biomass along the road where a fertilizer tank was emptied, or within urine spots from previous grazing (Figure 2). Radish root growth was consistently impeded at a depth of 6 inches indicating the presence of a root restrictive layer (Figure 3). There was noticeable earthworm activity surrounding the radish roots when dug.

Table 2. Annual cover crop mix seeded on June 15, 2019.

Species	Seeding Rate (lb/ac)	Percentage of Mix
Pearl millet	3	47
Sorghum-sudangrass	3	10
Kale	1	28
Radish	3	15
TOTAL	10	100



Fig. 2. Increased CC growth on a urine spot, Aug 6, 2019.



Fig. 3. Evidence of root restrictive layer at 6" depth, Aug 25, 2019.



Fig. 4. Many worms were observed near the radish roots, Sept 27, 2019.



Fig 5. Overhead view showing radish and millet seed heads, Sept 27, 2019.

Summary and Discussion:

Overall, this cover crop grew well with low weed pressure and produced beneficial above and below ground biomass. Ideally, this cover crop would be grazed at the proper stocking rate for economic return and manure benefits. Soil fertility may have been a limiting factor to cover crop biomass production. Depending on client goals, it may be beneficial to soil test and fertilize accordingly to improve cover crop growth.